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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/517,771	12/27/2004	Noriya Izu	263999US2PCT	7548

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EXAMINER	
HOANG, TU BA	

ART UNIT	PAPER NUMBER
2832	

DATE MAILED: 10/05/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/517,771	IZU ET AL.	
	Examiner	Art Unit	
	Tu Ba Hoang	2832	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-6 and 12-14* is/are rejected.

7)☒ Claim(s) *7-11 and 15-22* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *27 December 2004* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *03/28/05&01/03/06*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Drawings

Figures 1 and 2 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance. Furthermore, in Figure 2, the word "CIUCUIT" is misspelled.

The drawings are further objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the *electrode* being exposed to the atmospheric gas or *porous body* as recited in claim 1, the *heater* as recited in claims 6 and 17, and the *air/fuel ratio feedback* control system or system as recited in claims 9-11 and 20-22 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Priority

Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d). The certified copy has been filed in parent Application No. PCT/JP03/08052, filed on June 25, 2003.

Claim Objections

Claims 7-11 and 15-22 are objected to under 37 CFR 1.75(c) as being in improper form because a multiple dependent claim should refer to other claims in the alternative only, and/or, cannot depend from any other multiple dependent claim. See MPEP § 608.01(n). Accordingly, the claims have not been further treated on the merits.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-6 and 14-15 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites the limitation "the oxygen partial pressure" in line 5. There is insufficient antecedent basis for this limitation in the claim. The term "wherein:" noted at line 2 should be replaced with "comprising". The phrase "said temperature compensation unit" recited at line 9 should be changed to "said conductor" for avoiding confusion because as already recited on line 6, the compensation unit was composed of a conductor and it is confused when itself again composed of another conductor (i.e., the oxygen ion conductor recited at line 10). Otherwise, structural relationships between the conductor recited at line 6 and the oxygen ion conductor recited at line 10 are needed.

Claim 14 is indefinite because the symbol "α" in the formula noted at line 3 is undefined.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1 and 6 as being best understood are rejected under 35 U.S.C. 102(b) as being anticipated by Brothers et al (US 4,659,435). Brothers et al reference discloses substantially all features as claimed including a resistance-type oxygen sensor or probe assembly 20 with suppressed temperature dependence, wherein: **(1)** a gas detection unit or thermocouple 39 (shown in Figure 2a) is composed of at least an oxide semiconductor or *alumina* bores (as noted at column 13, lines 46-61, two bores of the alumina tube 100 containing leads 40 and 41 where Chromel-P or Alumel leads can be used) with a resistance value varying according to temperature and the oxygen partial pressure of atmospheric gas and a temperature compensation unit (30,43) is composed of at least a conductor or yttria stabilized zirconia electrolyte element 31 (see column 1, line 27, column 5, lines 20-40, and column 12, line 17, i.e., stabilized zirconia which is good oxygen ion conductor) with suppressed dependence of a value on oxygen partial pressure and a temperature compensator 43, wherein the gas detection unit 39 and the temperature conpensation unit (30,43) are at least connected in series as shown in Figure 1; **(2)** the conductor or electrolyte element 31 of the temperature compensation unit (30,43) is composed of or is an oxygen ion conductor made of yttria stabilized zirconia as set forth ealier (i.e., column 12, line 17, stabilized zirconia is a good oxygen ion conductor); **(3)** and at least a porous body electrode or gas porous electrode layer 37 (column 5, lines 26-28) can be used for electrical contact with the electrolyte element 31 of the temperature compensation unit (30,43) as shown in Figures 2-5 (i.e., or for electrical contact with the temperature compensation unit as a whole per se) and is also

exposed to the atmospheric gas or sample oxygen within the flue 24 as shown in Figure 2 and set forth at column 11, lines 30-32. Regarding claim 6, Brothers et al reference also includes an integral cell electrode/heater 35 formed of layer 37, pads 52,54, portions of leads 48,50 as set forth at column 11, lines 47-50 (also see at line 3 in the abstract).

Claims 12-13 are rejected under 35 U.S.C. 102(b) as being anticipated by Umemoto et al (US 6,150,299). Umemoto et al shows a catalyst support or promoter or a resistance-type oxygen sensor comprising an oxygen gas detection unit or catalyst promoter composed of an oxide semiconductor and a substrate (i.e. specific surface area) as structural elements (see column 2, lines 32-37), wherein the oxide semiconductor is an oxide comprising cerium ions and zirconium ions (see column 2, lines 18-20 and lines 49-52, and also in the abstract) and the ratio of amount of substance of zirconium ions to a sum total of amount of substance of cerium ions and zirconium ions is 20 to 49% by weight (which is within or overlap the recited range of 0.5-40 mol % or 5-40 mol %).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 2-3 as being best understood are rejected under 35 U.S.C. 103(a) as being unpatentable over Brothers et al in view of Kubo (US 4,519,237). Brothers et al reference discloses substantially all features of the claimed invention except for a unit

with a temperature dependence similar or identical to that of the gas detection unit is used as the temperature compensation unit (i.e., the temperature compensation unit and the gas detection unit are similar or the same in construction and can be interchangeable from one to another). Kubo shows the use of a gas detection unit 12 and a temperature compensation unit 14 in a series connection where they are similar or identical to each others as shown in Figure 1. It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize such arrangement having a gas detection unit 12 and a temperature compensation unit 14 of identical or similar construction in a series connection as taught by Kubo in order to position the temperature compensation unit or thermistor near the sensing element so that the temperature of the compensation unit substantially coincides with the temperature of the sensing element if so desired.

Claims 4-5 as being best understood are rejected under 35 U.S.C. 103(a) as being unpatentable over Brothers et al in view of Tien et al (US 4,387,359). Brothers et al reference discloses substantially all features of the claimed invention except for the oxide semiconductor, which is the gas detection unit, is cerium oxide or a composite oxide comprising cerium oxide as the main component and the oxygen ion conductor, which is the temperature compensation unit, is a composite oxide comprising cerium oxide as the main component (i.e., the material for both the oxide semiconductor or gas detection unit and the oxygen ion conductor or the temperature compensation unit is a composite oxide having cerium oxide as the main component). It is noted that use of cerium oxide as the base or main component for oxide semiconductor or oxygen ion conductors used in gas sensors is old and well known in the art, as evidence, Tien et al (US 4,387,359) discloses an oxygen sensor utilizes chrome oxide compensating resistor in series with a titania sensing resistor where the oxides used for the oxide semiconductor of the sensing resistor and the oxygen ion conductor of the compensating resistor can also included cerium oxide as the base component. It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize in the oxide components of Brothers et al the oxide including cerium oxide as the main component as taught by Tien et al in order to form the oxide semiconductor gas sensing element or the oxygen ion conductor or temperature compensating unit with improvement in oxygen sensitivity.

The following is a statement of reasons for the indication of allowable subject matter: The prior art of record does not show or suggest the resistance value at a temperature of 800 degree C is 20 Ωm or less, where n in the formula recited in claim 14 is from 4 to 5.5.

Claim 14 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: Heijne (US 4,001,756), Bienkowski et al (US 4,147,513),

Schlesselman et al (US 4,225,842), Takahashi et al (US 4,574,264), Ando et al (US 6,375,828), Chan et al (US 2006/0057048), and Izu et al (US 2006/0081473).

Each recitation should be separately considered and considered in conjunction with others in response to this Office Action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tu Ba Hoang whose telephone number is (571) 272-4780. The examiner can normally be reached on Mon-Thu from 6:00AM to 6:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Elvin Enad can be reached on (571) 272-1990. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Tu Ba Hoang
Primary Examiner
Art Unit 2832

September 20, 2006